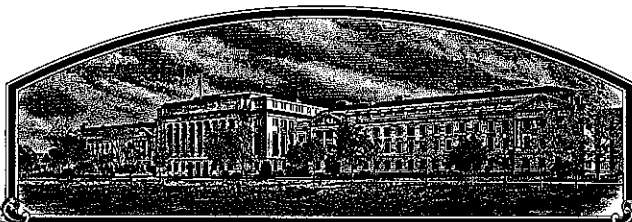


No.

9300018



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

*Northrup King Co.*

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREBY ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (U.S.C. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'S46-44'



In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 31st day of October in the year of our Lord one thousand nine hundred and ninety-four.

Attest:

*Kenneth H. Evans*

Commissioner

Plant Variety Protection Office  
Agricultural Marketing Service

*Mike Esny*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

**APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE**  
(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) Northrup King Co.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO. J616544	3. VARIETY NAME S46-44
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) P. O. Box 949 Washington, Iowa 52353-0949 Attention: John C. Thorne		5. PHONE (Include area code) 319-653-2181	<b>FOR OFFICIAL USE ONLY</b> PVPO NUMBER 9300018 Filing and Examination Fee: \$2150.00 Date Nov. 10, 1992 Certificate Fee: \$250.00 Date Sept. 30, 1994
6. GENUS AND SPECIES NAME Glycine max	7. FAMILY NAME (Botanical) Leguminosae		
8. CROP KIND NAME (Common Name) Soybean	9. DATE OF DETERMINATION November, 1986		
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Delaware		12. DATE OF INCORPORATION 1976	

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

Dr. John C. Thorne  
Northrup King Co.  
P. O. Box 949  
Washington, Iowa 52353-0949

PHONE (Include area code): 612-593-7305

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

a. ☒ Exhibit A, Origin and Breeding History of the Variety.

b. ☒ Exhibit B, Novelty Statement.

c. ☒ Exhibit C, Objective Description of Variety.

d. ☐ Exhibit D, Additional Description of Variety.

e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office \_\_\_\_\_

g. ☒ Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.)

☐ YES (If "YES," answer items 16 and 17 below) ☒ NO (If "NO," skip to item 18 below)

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?

☐ YES ☒ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?

☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date. \_\_\_\_\_) ☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?

☐ YES (If "YES," give names of countries and dates) ☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT (Owner(s)) John C. Thorne	CAPACITY OR TITLE Soybean Research Dir.	DATE 11/2/92
SIGNATURE OF APPLICANT (Owner(s))	CAPACITY OR TITLE	DATE

## EXHIBIT A

## Origin and Breeding History of the Variety

The soybean variety 'S46-44' is derived from the cross 'A5474' x 'A3127'. The cross was made in the summer of 1983 by the Northrup King Co. soybean research staff at St. Joseph, IL. The F1 and F2 generations were grown at the Northrup King Co. Research Center at Waimea, Kauai, Hawaii during the winter of 1983-84. The F3 generation was grown at St. Joseph in the summer of 1984; the F4 and F5 at Waimea during the winter of 1984-85, and the F6 at St. Joseph in the summer of 1985. The F2, F4, and F5 generations were advanced by harvesting 2-4 seeds from each plant and planting a 600 seed sample from the bulk. Mass selection was practiced in the F3 and F6 generations for Group IV or earlier maturity. In the fall of 1985 approximately 100 early F6 plants were harvested and threshed individually. The progeny from these plants were grown in F7 progeny rows in the summer of 1986. One of these, numbered J616544, was selected on the basis of agronomic appearance to be tested in a preliminary yield trial in 1987. This line was subsequently tested under the temporary designation X9146 and named S46-44. It has been tested at several midwestern and midsouth U.S. locations from 1988 to 1991 and found to yield well compared to other Maturity Group IV cultivars. Descriptive traits including purple flowers, tawny pubescence, brown pods, and black hilum have been identified and confirmed. S46-44 has been tested for reaction to Races 1, 3, 4, and 7 of Phytophthora megasperma using hypocotyl inoculation of greenhouse grown plants and found to have the Rps 1-C gene for resistance. It has been tested in fields known to be infested with soybean cyst nematode (Heterodera glycines) near Conesville, IA and St. Joseph, IL since 1988 and has tested resistant. In addition, it was tested in the greenhouse at the Northrup King Research Center at Bay, AR, for resistance to Races 3 and 14 (formerly Race 4) and found to be resistant to both races. This resistance was verified by tests conducted by Dr. Lawrence Young, USDA nematologist at Jackson, TN.

In the winter of 1988-89, 300 seeds of S46-44 were planted at Waimea. At harvest, 100 plants were harvested and threshed individually and their progeny planted at St. Joseph in the summer of 1989 to monitor variability and to produce Pedigree Seed. A few plants with white flowers or grey pubescence were removed. These plants were assumed to have come from admixture or out-crossing. Uniform rows were bulked to produce Pedigree Seed. This seed was planted in 1990 to produce Breeder Seed. The increase block was rogued carefully during flowering and at maturity.

Foundation Seed of S46-44 was produced in 1991. The Iowa Crop Improvement Association inspected the field and found it to meet the standards for Foundation Seed. The National Soybean Variety Review Board approved the variety for Certification on December 12, 1991.

S46-44 is a stable and uniform variety except for minor environmentally induced variation encountered in any soybean variety. In five years of testing and three years of seed increase, no other variants have been observed. Any off-type plants which were removed from increase fields were assumed to have arisen from admixture or outcrossing.

Varietal purity will be maintained using progeny rows as described above as needed.

## EXHIBIT B

## Novelty Statement for the Variety

Soybean variety S46-44 is most similar to Fayette and TN4-86. It can be differentiated from these varieties on the basis of pod color. S46-44 has brown pods while Fayette and TN4-86 have tan pods.

U.S. DEPARTMENT OF AGRICULTURE  
 AGRICULTURAL MARKETING SERVICE  
 LIVESTOCK, MEAT, GRAIN & SEED DIVISION  
 PLANT VARIETY PROTECTION OFFICE  
 BELTSVILLE, MARYLAND 20705

EXHIBIT C  
 (Soybean)

OBJECTIVE DESCRIPTION OF VARIETY  
 SOYBEAN (*Glycine max* L.)

NAME OF APPLICANT(S) Northrup King Co.	TEMPORARY DESIGNATION J616544, X9146	VARIETY NAME S46-44
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) P. O. Box 949 Washington, Iowa 52353-0949 Attention: John C. Thorne		FOR OFFICIAL USE ONLY PVPO NUMBER 9300018

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g.,   ).

## 1. SEED SHAPE:



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)  
 3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)

2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)  
 4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

## 2. SEED COAT COLOR: (Mature Seed)

1 = Yellow

2 = Green

3 = Brown

4 = Black

5 = Other (Specify) \_\_\_\_\_

## 3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

1 = Dull ('Corsoy 79'; 'Braxton')

2 = Shiny ('Nebsoy'; 'Gasoy 17')

## 4. SEED SIZE: (Mature Seed)

Grams per 100 seeds

## 5. HILUM COLOR: (Mature Seed)

1 = Buff

2 = Yellow

3 = Brown

4 = Gray

5 = Imperfect Black

6 = Black

7 = Other (Specify) \_\_\_\_\_

## 6. COTYLEDON COLOR: (Mature Seed)

1 = Yellow

2 = Green

## 7. SEED PROTEIN PEROXIDASE ACTIVITY:

1 = Low

2 = High

## 8. SEED PROTEIN ELECTROPHORETIC BAND:

1 = Type A (SP1<sup>a</sup>)2 = Type B (SP1<sup>b</sup>)

## 9. HYPOCOTYL COLOR:

1 = Green only ('Evans'; 'Davis')

2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')

3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')

4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

## 10. LEAFLET SHAPE:

1 = Lanceolate

2 = Oval

3 = Ovate

4 = Other (Specify) \_\_\_\_\_

## 11. LEAFLET SIZE:

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☐ 21 = Small ('Amsoy 71'; 'A5312')  
3 = Large ('Crawford'; 'Tracy')

2 = Medium ('Corsoy 79'; 'Gasoy 17')

## 12. LEAF COLOR:

☐ 21 = Light Green ('Weber'; 'York')  
3 = Dark Green ('Gnome'; 'Tracy')

2 = Medium Green ('Corsoy 79'; 'Braxton')

## 13. FLOWER COLOR:

☐ 2

1 = White

2 = Purple

3 = White with purple throat

## 14. POD COLOR:

☐ 2

1 = Tan

2 = Brown

3 = Black

## 15. PLANT PUBESCENCE COLOR:

☐ 2

1 = Gray

2 = Brown (Tawny)

## 16. PLANT TYPES:

☐ 21 = Slender ('Essex'; 'Amsoy 71')  
3 = Bushy ('Gnome'; 'Govan')

2 = Intermediate ('Amcor'; 'Braxton')

## 17. PLANT HABIT:

☐ 3

1 = Determinate ('Gnome'; 'Braxton')

3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

2 = Semi-Determinate ('Will')

## 18. MATURITY GROUP:

☐ 7

1 = 000

2 = 00

3 = 0

4 = I

5 = II

6 = III

7 = IV

8 = V

9 = VI

10 = VII

11 = VIII

12 = IX

13 = X

## 19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

## BACTERIAL DISEASES:

☐ 2Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)☐ 1Bacterial Blight (*Pseudomonas glycinea*)☐ 2Wildfire (*Pseudomonas tabaci*)

## FUNGAL DISEASES:

☐ 1Brown Spot (*Septoria glycines*)Frogeye Leaf Spot (*Cercospora sojina*)☐ 1

Race 1

☐

Race 2

☐

Race 3

☐

Race 4

☐

Race 5

☐ 1

Other (Specify)

Unspecified

☐Target Spot (*Corynespora cassicola*)☐Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)☐ 1Powdery Mildew (*Microsphaera diffusa*)☐ 2Brown Stem Rot (*Cephalosporium gregatum*)

Moderately Resistant

☐ 2Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

Moderately Resistant

## FUNGAL DISEASES: (Continued)

☒ 1 Pod and Stem Blight (*Diaporthe phaseolorum* var; *sojae*)

☒ 1 Purple Seed Stain (*Cercospora kikuchii*)

☐ Rhizoctonia Root Rot (*Rhizoctonia solani*)

Phytophthora Rot (*Phytophthora megasperma* var. *sojae*)

☒ 2 Race 1 ☒ 2 Race 2 ☒ 2 Race 3 ☒ 1 Race 4 ☐ Race 5 ☐ Race 6 ☒ 2 Race 7

☐ Race 8 ☐ Race 9 ☐ Other (Specify) \_\_\_\_\_

## VIRAL DISEASES:

☐ Bud Blight (Tobacco Ringspot Virus)

☐ Yellow Mosaic (Bean Yellow Mosaic Virus)

☐ Cowpea Mosaic (Cowpea Chlorotic Virus)

☐ Pod Mottle (Bean Pod Mottle Virus)

☐ Seed Mottle (Soybean Mosaic Virus)

## NEMATODE DISEASES:

Soybean Cyst Nematode (*Heterodera glycines*)

☐ Race 1 ☐ Race 2 ☒ 2 Race 3 ☒ 2 Race 4 ☐ Other (Specify) Resistant to old Race 4,  
now generally referred to  
as Race 14.

☐ Lance Nematode (*Hoplolaimus Colonus*)

☐ Southern Root Knot Nematode (*Meloidogyne incognita*)

☐ Northern Root Knot Nematode (*Meloidogyne Hapla*)

☐ Peanut Root Knot Nematode (*Meloidogyne arenaria*)

☐ Reniform Nematode (*Rotylenchulus reniformis*)

☐ OTHER DISEASE NOT ON FORM (Specify): \_\_\_\_\_

## 20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

☐ Iron Chlorosis on Calcareous Soil

☐ Other (Specify) \_\_\_\_\_

## 21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

☐ Mexican Bean Beetle (*Epilachna varivestis*)

☐ Potato Leaf Hopper (*Empoasca fabae*)

☐ Other (Specify) \_\_\_\_\_

## 22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Fayette	Seed Coat Luster	A3127
Leaf Shape	A3935	Seed Size	A3935
Leaf Color	S42-30	Seed Shape	A3127
Leaf Size	S42-50	Seedling Pigmentation	S36-36



## 23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/POD
				CM Width	CM Length	% Protein	% Oil		
Submitted	140	2.3	103	6.7	11.5	39.8	22.0	16.1	2-4
Fayette Name of Similar Variety	134	2.7	101	7.1	11.2	40.8	22.0	17.3	2-4

## PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBT1-A<sub>2</sub> in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

**EXHIBIT E****Statement of the Basis of Applicant's Ownership**

Soybean variety S46-44 was developed from germplasm sources cited in Exhibit A of this application. Northrup King Co. believes that the variety is novel as defined in the Plant Variety Protection Act and, therefore, that Northrup King Co. is the sole owner of the variety.